Geologic Mapping with the MODIS ASTER (MASTER) Airborne Simulator at Cuprite, Nevada

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Abstract

The MODIS ASTER (MASTER) airborne simulator is a 50-channel scanner built by Daedalus, and operated by NASA from several aircraft platforms. With an IFOV of 2.5 mrad, the ground footprint is 5-50m, depending on platform; the swath width is 716 pixels. There are 11 channels between 0.43-0.95 microns, 14 from 1.5-2.3 microns, 15 from 3-5.3 microns, and 10 from 7.6-13.1 microns. In 1999, data were acquired over the Cuprite Mining District, Nevada, with a pixel size of 10 m. The data were pre-processed to convert to reflectance for the VIS-NIR-SWIR bands, and temperature-emissivity separated for the TIR bands (the MIR channels were not functioning). Mineral maps were produced for the 3 different wavelength regions, and compared to AVIRIS-derived maps produced by Swayze. While solid solution series could not be recovered, major mineral types were mappable and identifiable. The data were also used to simulate ASTER satellite bands, and mineral separations attempted. The broader bands of ASTER limited the ability to identify minerals, but satisfactory separation was possible.

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